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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHANG, AUDREY Y

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 10/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/700,182	FERDINAND ET AL.
Examiner	Art Unit	
Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 19 August 2002.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 13-27 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 13-27 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____	6) <input type="checkbox"/> Other: _____

**DETAILED ACTION*****Remark***

- This Office Action is in response to applicant's amendment filed on August 19, 2002, which has been entered as paper number 16.
- By the amendment, the applicant has amended claims 13-24 and has newly added claims 25-27.
- Claims 13-27 remain pending in this application.
- The rejection to claims 13-24 under 35 USC 112, first paragraph, set forth in the previous Office Action dated December 7, 2001, is withdrawn in response to applicant's amendment.
- The rejection to claim 16 under 35 USC 112, first paragraph, set forth in the previous Office Action dated December 7, 2001 **still holds**.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 17-19, 22 and 27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.**

*Claim 17 has been amended* to recite an apparatus for writing a Bragg grating by having a phase plate and a means for adjusting the position of the phase plate, the specification fails to teach how would a Bragg grating be written by *simply* having a phase plate and means for adjusting the phase plate.

Claims 18-19 and 27 inherit the rejection from their based claim.

*Claim 22 has been amended* to recite the process for writing a Bragg grating further comprising the step for forming a Fabry-Perot cavity, which is not enabled by the specification. The specification fails to teach how could the process of writing a Bragg grating is done by forming a Fabry-Perot cavity.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 13-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The claims are generally narrative and indefinite, failing to conform with current U.S. practice.

*They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors. The applicant is respectfully requested to present the claims in clear and concise manner. Without properly state the claims in structural, logical and operable manners, it is very difficult if not impossible for the examiner to examine the application.*

The applicant is respectfully requested to make sure the claims are *structurally corresponding* and *correlating* to each other so that the features recited in the independent claims are in logical connection with the elements recited in the dependent claims to clearly and definitely define the scopes of the claims and to make the claims operable.

The examiner can only point out a few errors and indefinites. It is *applicant's responsibility* to make the claims in comply with the requirements of 35 USC 112, first and second paragraphs.

The amended claim 13 recites the phrase "generates a corresponding phase shift in the Bragg grating" is in *error* and indefinite. The phase shift is *recorded* in grating *as* the Bragg grating but it does not generate a phase shift in the Bragg grating.

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Claims 14 and 15 are functional since they each fail to provide appropriate means for carrying out the functions “amplitude separation configuration” and “wave front separation configuration”. It is not clear what is considered to be an “amplitude separation configuration” and what is considered to be “wavefront separation configuration”.

The phase “the position of the phase shift” recited in claim 16 appears to be vague and indefinite since a “phase shift” is a **mathematical abstract object** that does not have a **physical position**. The applicant is respectfully reminded that if a *spatial function* of the phase shift is intended then such feature should be clearly stated. The phase shift plate could have a physical position but the phase shift, which is a mathematical number, cannot have a physical position.

*Claim 17 has been amended* to include the feature “creating a phase shift between at least two sub-beams” which is confusing and indefinite since it is not clear what are these two sub-beams where do they come from.

The phrase “the interference pattern is transferred” or the phrase “transferring the interference pattern” recited in various claims (such as 18, 19 and 27) is vague, indefinite and in error since it is not clear how can the “interference pattern” be “transferred”. The applicant is respectfully noted that the interference pattern is formed by the two coherent beams at the substrate or **at the place** they intercept each other. Before these two beams intercept each other, which in this case occurs at the substrate, there is **no interference pattern** exists and no such pattern can be **transferred** in any way.

Claims 21 and 23 are narrative, functional and *confusing*. It is not clear what are the scopes and the limitations of the claims. The claims are not making any physical sense. The applicant is once again respectfully requested to draft the claim in such a manner that presents a *logical* and *operable* process/apparatus.

The phrase “a phase plate” recited in amended claim 21 is indefinite since it is not clear how does it relate to the phase plate recited in its based claim.

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The phrase “said light guide” recited in newly submitted claim 25 is indefinite and confusing since it lacks proper antecedent basis from its based claim.

The phrase “Bragg grading” recited in newly submitted claim 26 is wrong.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 13-14, 16, 17-18, 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Inoue et al (PN. 4,792,197) in view of Kashyap (PN. 6,307,679).**

Inoue et al teaches a *fabrication apparatus* and *method for writing a Bragg grating in a substrate* (15, Figure 4) wherein the apparatus comprises a *light source* for generating *two coherent light beams* of same *wavelength*. A *phase plate* (24) having *different phase shift regions* (please see Figure 5), is placed in one of the light beam path to create *sub-beam portions* that have different phase shift. The phase modulated sub-beam portions are interfered with the other light beam at the substrate to create an *interference pattern* that is recorded within the substrate as the *Bragg grating*, (please see columns 3-4). Inoue et al teaches that the phase plate may be placed at *different positions*, (21, 22 or 23), which suggests the plate may be displayed in translational sense. Inoue et al also teaches that the phase plate may be put at different angular positions (Figures 6a and 6b) to create different phase shift effects to the light beam. This suggests that the phase plate is adjustable. Although this reference does not teach explicitly about a means for doing such adjustment, such feature is either inherently met or an obvious modification to one skilled in the art for the benefit of actually carrying out the adjustment.

Inoue et al teaches that the Bragg grating is formed on the substrate based on photochemical reaction of the substrate material with the interference pattern. In general, a Bragg grating is by definition a modulation of the refractive index of the substrate material. Inoue et al however does not teach such *explicitly*. Kashyap in the same field of endeavor teaches an apparatus for writing Bragg grating using interferometric arrangement wherein a refractive index grating is formed, (please see Figure 1-2A). It would then have been obvious to one skilled in the art to apply the teachings of Kashyap to modify the grating of Inoue et al, mostly involving the selection of the substrate material, to be a refractive index grating for the benefit of providing an alternative grating form for the grating recorded.

With regard to claims 14 and 18, Inoue et al teaches that an interferometric arrangement including two mirrors (141 and 142) are used to conduct the coherent light beams to the substrate.

With regard to claim 16, the phase plate (24) has spatially differed phase shift values wherein such phase shift will be imparted on one of the coherent light beam to make it contribute to the light beam in the wave function form as a conjugate variable with respect to the time variable.

With regard to claim 20, Inoue et al teaches that the phase plate introduces a phase shift of  $\lambda/2$ , which corresponds to a  $\pi$  phase difference, (please see column 3, lines 42-45).

With regard to claims 21, 23 and 26, the scopes of the claims are not definite and are not clear for the reasons stated above. The claims therefore cannot be examined in details. Kashyap teaches that a pre-written Bragg grating with no phase shift introduced to the recording beam (3a) may be formed within the optical fiber before recording the Bragg grating with phase shifting arrangement, (please see Figure 5 and columns 5-6). With regard to claims 23 and 26, Kashyap teaches that the refractive index grating operated as a Bragg grating is an apodized Bragg grating, (please see the abstract).

With regard to claim 22, this reference does not teach that the apparatus for fabricating the Bragg grating involves forming a Fabry-Perot cavity. However the instant application also does not teach such.

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This feature therefore cannot be addressed here because it makes no physical sense. As far as of utilizing a pair of Bragg gratings to form a Fabry-Perot cavity, such application is a standard practice in the art.

With regard to claim 24, Inoue et al does not teach explicitly that the adjustment of the phase plate is by programmable movement. However such modification is considered to be an obvious matter of design choice since to use programmable movement means is quite common in the art and such modification would have been obvious to one skilled in the art for the benefit of providing a better control for the adjustment.

With regard to claim 25, the “light guide” is not defined. Inoue et al teaches that the Bragg grating is used in a DFB laser which commonly utilizes an optical fiber grating. Kashyap teaches that the Bragg grating is formed in an optical fiber, (please see Figure 1).

**7. Claims 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Inoue et al and Kashyap as applied to claims 13 and 17 above, and further in view of the patent issued to Kashyap et al (PN. 5,377,288).**

The apparatus and method for fabricating a Bragg grating using interferometric arrangement as taught by Inoue et al in combination with the teachings of Kashyap ('679) as described for claims 13 and 17 above have met all the limitations of the claims. Inoue et al teaches the interferometric arrangement is using two mirrors however it does not teach that the interferometric arrangement may also be achieved by using a prism. *Kashyap* et al ('288) in the same field of endeavor teaches a method and apparatus for writing a refractive index grating wherein a prism (6, Figures 1, 2, and 5) is used as the interferometric arrangement for providing two coherent beams to interfere with each other on an optical fiber (2) in order to record the refractive index grating in the fiber. It would then have been obvious to one skilled in the art to apply the teachings of Kashyap et al to modify the apparatus of Inoue et al for the benefit of providing an alternative arrangement for creating the Bragg grating.

8. **Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Inoue et al and Kashyap as applied to claim 17 above, and further in view of the patent issued to Cook et al (PN. 5,629,998).**

The apparatus and method for fabricating a Bragg grating using interferometric arrangement as taught by Inoue et al in combination with the teachings of Kashyap as described for claim 17 above have met all the limitations of the claims. Inoue et al teaches the interferometric arrangement is using two mirrors however it does not teach that the interferometric arrangement may also be achieved by using a Lloyd's mirror. Cook et al in the same field of endeavor teaches a method and apparatus for writing refractive index grating in an optical fiber wherein an interferometric arrangement including the Lloyd's mirror is employed, (please see Figure 1 and columns 1-2). It would then have been obvious to one skilled in the art to apply the teachings of Cook et al to modify the apparatus of Inoue et al for the benefit of providing an alternative interferometric arrangement for recording the refractive index Bragg grating in the substrate.

*Response to Arguments*

9. Applicant's arguments with respect to claims 13-24 and newly added claims 25-27 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments are mainly drawn to newly amended claims and newly added claims. They have been addressed in the paragraphs above.

*Conclusion*

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

*Audrey Y. Chang*  
Primary Examiner  
Art Unit 2872

A. Chang, Ph.D.  
October 23, 2002